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ABSTRACT

Irregularities in oral fluency, or "disfluencies," are common in the speech habits of both children and adults. Disfluencies can take the form of hesitations, revisions, repetitions, or interjections. Most disfluenceies do not occur at random, but are directly linked to other factors such as verbal planning--the combination of decisions a speaker must make during the communication process--word choice, grammatical structure, and the level of abstraction, or "ideation level," whereby statements are classified as a simple enumeration of objects, a verbalized description of objects, or an interpretive conclusion. Forty preschool children were asked to describe what they saw in a series of photographs, and their responses were analyzed on ideation levels. Results indicated that verbal planning is directly related to the frequency of speech disfluencies and that more disfluencies occurred at the descriptive level than at the interpretive level. Differences at the enumerative level were not significant. Differences between males and females or middle class and lower class children were not significant, although middle class males produced more disfluencies than middle class females. (RN)

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November, 1973

# THE RELATIONSHIP OF SEX, SOCIAL CLASS AND VERBAL PLANNING TO THE DISFLUENCIES PRODUCED BY NONSTUTTERING PRESCHOOL CHILDREN

Irregularities in fluency, referred to as disfluencies, nonfluencies and hesitation phenomena, are common occurrences in the speech of children and adults. Although considerable research has been devoted to the study of disfluencies, the results have been contradictory. On the basis of the research, however, one significant conclusion can be made. It would appear that most disfluencies do not occur randomly.

Investigators, from the vantage points of many disciplines have attempted to link the occurrence of disfluencies to language function, cognitive organization, personality variables and disorders of speech. Many of the relationships between disfluency and the above variables, however, have not been established thoroughly.

Most of the research investigating the influence of language on disruptions in speech has focused on verbal planning, the decision-making process in which speakers engage every time they communicate. After a person achieves some cognitive representation of an idea, he must make several decisions, such as word choice, grammatical structure, phrasing and level of abstraction prior to and during his verbalization of that idea. The decisions, which vary in complexity, location in the speech sequence, and frequency of occurren-

may affect the fluency of the speaker.

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It has been suggested that disfluencies are used by speakers to delay the flow of speech while decisions are being made (Blankenship and Kay, 1964). Researchers have attempted to identify relationships between indices of fluency irregularity and decisions made during verbal planning. Maclay and Osgood (1959) investigated the effects of grammatical and lexical decisions on different types of disfluency. Their results indicated that various types of disfluencies were distributed differently with respect to the grammatical function of words. They suggested that there may be some kind of cognitive mixer which would presumably function on various levels of difficulty since the amount of verbal planning needed to complete an utterance is a variable phenomenon.

There is some evidence which supports the contention that one type of disfluency, hesitation, differentiates between levels of abstraction of responses. During the process of verbal planning, decisions are made by a speaker concerning the abstraction level of his response. As the levels become more abstract, the decisions necessary to complete the response become more complex. Hesitations, which appear to extend the decision-making time, have been studied in relation to types of verbal behavior which require different levels of planning. Goldman-Eisler (1961) demonstrated that more pause time is required when abstracting and generalizing from perceived events than description of the same material. This finding corresponds to Berry's (1969) order of ideation levels. Berry

developed a classification system to identify the abstractness, i.e., ideation level, of a child's verbalized response to pictoral stimuli. According to her system, the most concrete response, enumeration, is one in which the child merely names objects, people, or activities. Since the response is concrete, the decisions the child must make to complete an enumerative utterance are not as complex as those required by a more abstract level of ideation such as interpretation. According to Goldman-Eisler's results, the increasingly complex levels in Berry's hierarchy would require greater pause time as one moves from a relatively simple process (naming familiar events in a picture) to a more complex one (interpretation of perceived events).

Blankenship and Kay (1964) studied the relationship between the occurrence of hesitation (a term they used to refer to seven types of disfluencies) and lexical and structural decisions. They observed that hesitations tended to occur in places of both lexical and structural uncertainty.

Goldman-Eisler (1968) identified three types of decisions which must be made in spontaneous speech: content, semantic and syntactic. Although she hypothesized that all three would result in a delay of speech, her results did not confirm the relationship between the syntactic factor and the location of pauses. Goldman-Eisler attributed pauses associated with semantic and content decisions to an increase in information. That is, when a speaker

faces a situation in which more than one word or idea could logically follow from what has already been said, there is an increase in information in the next word or idea uttered. Such points in the speech sequence are said to have low transitional probability. When there is low transitional probability, pausing increases.

No comparable results are available which indicate whether disfluencies other than hesitancies or pauses are sensitive to ideation levels, or the decision-making process involved in verbal planning.

Interest in the relationship between cognitive organization and the occurrence of disfluency stimulated hypotheses similar to those postulated in studies investigating the influence of linguistic features of disfluency. Tannenbaum et al. (1965) have suggested that two types of psycholinguistic phenomena are related to the occurrence of hesitation during encoding.

> One is a type of groping phenomenon, similar to that suggested by Goldman-Eisler. The speaker reaches a point where he cannot immediately elicit the "right" word, phrase, or sentence. Accordingly his speech is interrupted as he gropes for the appropriate term. An alternate type of hesitation-producing behavior stemming from feedback during encoding can also be postulated. The speaker, hearing himself say what he may not intend, interrupts his message production. Under such conditions, he may backtrack to correct himself or may be monentarily stunned and repeat himself. (Tannenbaum, Williams, and Hillier, 1965, p. 139)

Tannenbaum et al. associated the first type of behavior with filled and unfilled pauses (interjections and hesitations) and the second with the occurrence of false starts or repeats (revisions).

Levin and Silverman (1965) reported similar behavior in their study of disfluency in children's storytelling. They observed that when children perceived they had made error in their stories they corrected the errors. Levin and Silverman inferred that the tendency for repetitions and corrections to group together in factor analysis meant that,

> ... correction and repetitions are a conscious attempt by the subjects to do creditable jobs in their stories. That is, the child recognized he made an error and went back to correct it. (Levin and Silverman, 1965, p. 82)

Stuttering has represented a special area of interest for the investigation of disfluency since disfluency is an outstanding feature of the speech of stutterers. Understandably the bulk of disfluency research has been in this area. The question of similarity or continuity between disfluencies in stuttering and the disfluencies in normal speaking is a persisting issue in stuttering research. There are characteristics of disfluency which have enabled experimenters to differentiate stuttering from normal disruptions in speech. According to Wingate (1964), disruptions in the speech of stutterers typically consist of repetitions of elemental units (sounds, syllables, monosyllabic words), prolonations of sounds, and often are accompanied by facial and body movements extraneous to the production of speech sounds.

Studies performed with nonstutterers reveal that few prolongations are produced, disfluencies consist primarily of interjections

and revisions, and incomplete phrases consistently occur in children's speech (Ortsey, 1964; Burstein, 1965; Helsabeck, 1965; Kools and Berryman, 1971). Studies investigating hesitation phenomena (Goldman-Eisler, 1961; Blankenship and Kay, 1964) suggest that hesitations are also a frequent occurrence in normal speech.

Approaches to the Analysis of Disfluency: Two Problems

Two problems of analysis of disfluency which have evolved from research may account in part for the inconclusive results: 1) the selection of disfluency categories and 2) the method used to obtain speech samples.

An important problem in disfluency research concerns the definition of the dependent variable, disfluency. It is important to differentiate among disfluency types since evidence indicates that different types are not distributed identically. In a factor analytic study with both stutterers and nonstutterers, Levin and Silverman (1965) demonstrated that disfluencies tended to group in four factors: fluency-hesitation dimension, length of task dimension, deliberate hesitations and stressful hesitations. Maclay and Osgood (1959) observed that different types of disfluencies did not occur in identical linguistic environments. Some studies do not differentiate between categories in the same manner, nor do all studies include the same general classification.

An important measure related to both the quantitative and

qualitative description of disfluency has appeared in very few studies: this measure is the number of repetition units per instance of repetition. Branscom et al. (1955) suggested that this measure is useful in determining which individuals deviated in terms of persistency of repetition. Sander (1963) has shown that listeners tend to judge speakers to be stutterers more frequently as the number of double-unit syllable repetitions increases.

To obtain adequate normative data concerning disfluency, the types, frequencies of occurrence, and units per instance of occurrence (in the case of all repetitions) should be determined.

A second problem in disfluency research concerns the method used to elicit speech. Many studies investigating the occurrence of disfluency and stuttering have dealt with speech samples elicited in an oral reading task. While certain valuable information can be gleaned from research which measures irregularity of fluency in an oral reading situation, it is more meaningful to compare disfluencies in a variety of situations.

Lanyon (1968, p. 550) commented on the difference between reading and spontaneous speech situations for both nonstutterers and stutterers:

> Observation and clinical experience indicates that both stutterers and normals often react to reading situations in a different manner from spontaneous speech, so that caution should be observed in generalizing from one situation to another.

Silverman (1972) compared disfluency data of nonstutterers obtained from a structured interview with data from the same subjects in a spontaneous speech situation. She found that the different situations resulted in different amounts of disfluency in preschool male nonstutterers.

Part of the difference between samples of fluency obtained in structured versus spontaneous situations may be due to the kinds of decision-making required. When repeating a passage, a speaker has considerably fewer decisions to make during speech production than a person involved in spontaneous conversation. Generalizations should consider the limitations of the methods used to elicit speech in disfluency research.

Sex and Social Class Influence

Although there is clearly a difference between the ratio of male to female stutterers, the information about disfluency ratios of nonstutterers is contradictory. When disfluencies are analysed according to type some differences have been observed between male and female nonstutterers. Helsabeck (1965) reported that fourth grade nonstuttering males produced significantly more interjections and revisions than females. Kools and Berryman (1971) observed that first grade males produced significantly more incomplete phrases than females. Burstein (1965) found no significant differences between nonstuttering male and female first grade child-

ren on any type of disfluency. Thus, there is contradictory evidence concerning the frequencies of specific types of disfluency and the influence of sex.

There is a paucity of information concerning the relationship between social class and disfluency. Bloodstein (1969) summarized the influence of social class on stuttering incidence and concluded that there is little evidence of a relationship. Bernstein (1962), however, found that subjects from the working class in England, who used a predominately restricted code had less pause time in their speech than subjects from the British middle class who used a more elaborated code. According to Bernstein, hesitations differentiate language codes which are a reflection of social class. There has been no comparable research in the United States testing Bernstein's hypothesis or determining whether social class is related to disfluencies other than pauses.

## Purpose

Although there is similarity in research reports concerning the influence of sex, social class and verbal planning on the types, frequencies and loci of stutterings, the results are contradictory with respect to disfluencies in the speech of nonstutterers. The purpose of this study was to utilize an extensive category system of disfluency to examine the influence of sex, social class and ideation levels (one decision made in the verbal planning process) on the disfluency behavior of preschool children.

The preschool period was selected because it is one of the most crucial stages in the development of speech and language, and it is the stage in which most stutterers are identified. The preschool child is involved in a rapid process of language acquisition. As his semantic decisions become more abstract, his statements must reflect this in structural complexity. Although he may be capable of interpreting and generalizing and has learned the grammatical rules of adult language (Menyuk, 1964), he cannot produce all semantic and syntactic levels with equal facility. The difficulties children experience in verbal planning may be reflected in their fluency behavior.

## METHODS AND PROCEDURES

The following predictions were made concerning the disfluency distribution:

1. Males produce more disfluencies than females.
2. Middle class children produce more disfluencies than lower class children.
3. Ideation levels influence the distribution of disfluency.
4. The disfluencies produced by a nonstuttering preschool population are those characteristic of normal speech disruption.
   a. Disfluencies consist largely of interjections, pauses, and revisions.
   b. For each type of repetition produced, instances of repetition rarely exceed one repetition unit.

### Subjects

Forty children were randomly selected from two nursery school systems for this study. The children ranged in age from 48 to 60 months with a mean age of 55 months. Twenty children, 10 male and 10 female were selected from the middle class nursery school population in Amherst, New York and 20 children, 10 male and 10 female, were selected from Head Start centers in the inner city of Buffalo, New York. The subject pools from Amherst and Buffalo adequately represent the middle and lower classes respectively on three criteria which have been used for social stratification (Williams and Naremore, 1969): occupation and educational level of the parent, and residential area. Children who had been referred for diagnosis of

hearing, emotional, intelligence or speech disorders were eliminated from the selection.

Materials

The photographs used to stimulate speech were selected from the Let's Start series. These particular pictures were chosen because they portray preschool activities familiar to both middle class and inner city children.

Task

Speech was elicited in a structured interaction environment. The interviewing procedure used is similar to one used by Winitz (1959). The children were asked, "What can you tell me about this picture?" The question is open-ended and permits free response. When necessary the investigator used neutral probes to faciliate speech stimulation.

Measurements

A complete transcript was made of each interview. The investigator reviewed the transcripts and identified the level of each response and the number, location, and types of disfluencies which occurred. The transcript of each child's speech was divided into 100 word segments. Word counts were based on the system described by Burstein (1965). The number of disfluencies per 100 words was calculated for all disfluencies and for each individual type of

disfluency. The units of repetition per instance were tabulated for each type of repetition. The definition of response was based on a classification of an utterance (Fries, 1963).

The ideation level of each response made by each child was determined by applying a category system derived from Berry (1969).

The levels used were:

1. Enumeration-simple naming of objects, people or activities. For example: I see a policeman and three boys.

2. Description-verbalized perception of a picture with interpretation or abstraction. For example: The policeman is giving the basketball to the three boys.

3. Interpretation-abstraction and generalization of a picture which often involves fantasy and inference. For example: The policeman is giving the basketball to the three boys because it rolled out in the street when they were playing with it.

Occasionally something in the stimulus object being presented triggered a verbalization from the child which can best be described as spontaneous speech. An example of this behavior is, "Did you know my daddy gave me a frisbee? It's a red one and I keep it in my room." Spontaneous speech was included in a second analysis because of its frequency of occurrence in the children's speech.

A specific category system was used to identify disfluencies. The category selection was based on systems developed by Johnson (1961), Wingate (1964), and Goldman-Eisler (1968). Disfluencies were defined as irregularities in fluency characterized by:

1. Repetitions

   a. Monosyllabic
      1) Sound
      2) Syllable
      3) Word

   b. Polysyllabic
      1) Word
      2) Phrase

2. Prolongations

3. Unfilled pauses (hesitations)

4. Filled pauses
   a. Interjections of sounds
   b. Interjections of words

5. Revisions

6. Incomplete phrases

7. Broken words

8. Unfinished words

Reliability

Ten samples of speech were selected at random by a speech pathologist who acted as a judge to determine interjudge reliability. One hundred judgments were made. The investigator and the judge disagreed on only two identifications of disfluency. There was 100 percent agreement on the identification of ideation levels.

## RESULTS

The level of significance selected to reject the null hypothesis was .05. The relationship of sex and social class to the occurrence of disfluencies was assessed in terms of the number of disfluencies per 100 words (Table 1). The difference between males and females was not significant, although the means indicated that males produce slightly more disfluencies than females, as predicted (Table 2). The difference between the amount of disfluencies produced by middle and lower class children was not significant. According to the means, however, middle class children appear to produce slightly more disfluencies than lower class children. Middle class males produced the greatest number of disfluencies. When middle class males and females were compared on a directional one-tailed test, the resultant value of 2.011 was significant at the .05 level.

There was more variation than anticipated among the amounts of disfluencies produced by children within their subgroups (Table 3). In view of the within group variation it is possible that some variable other than sex or social class is more directly related to the production of disfluencies.

The most frequently occurring disfluencies for males, females middle and lower class children on each ideation level were interjections of sounds, hesitations, revisions, and repetitions of monosyllabic words (Tables 4, 5, 6, and 7). Most disfluencies occurred on the description level (Table 8).

TABLE 1

Univariate analysis of variance testing the relationship of sex and social class to the total number of disfluencies produced per 100 words

| Source of Variation | d.f. | Mean Square | F | P< |
|---|---|---|---|---|
| Sex (Male-Female) | 1 | 138.0122 | 2.8848 | .0981 |
| Social Class (Middle Lower) | 1 | 115.0566 | 2.4049 | .1298 |
| Sex by Social Class Interaction | 1 | 80.0324 | 1.6729 | .2042 |
| Within | 36 | 47.8418 | | |

TABLE 2

Cell means and standard deviations for the total number of sidfluencies per 100 words according to sex and social class

| SEX | SOCIAL CLASS | | SEX MEANS |
|---|---|---|---|
| | Middle | Lower | |
| MALE | | | |
| Mean | 18.323 | 12.102 | 15.21 |
| Std. Dev. | 9.079 | 6.182 | |
| FEMALE | | | |
| Mean | 11.779 | 11.216 | 11.50 |
| Std. Dev. | 4.836 | 6.878 | |
| SOCIAL CLASS MEANS | 15.05 | 11.66 | |

TABLE 3

Disfluency rate of subjects by sex and social class

| Sex and Social Class | Average of Disfluencies per 100 words | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1-4.9 | 5-8.9 | 9-12.9 | 13-16.9 | 17-20.9 | 21-24.9 | 25-29.9 | 30-33.9 | 34-37.9 |
| Middle Class Males | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 1 |
| Lower Class Males | 0 | 5 | 1 | 2 | 1 | 1 | 0 | 0 | 0 |
| Middle Class Females | 0 | 3 | 4 | 1 | 2 | 0 | 0 | 0 | 0 |
| Lower Class Females | 1 | 5 | 0 | 1 | 2 | 1 | 0 | 0 | 0 |

Note: Cell numbers indicate frequency of subjects

TABLE 4

The mean number of disfluencies per 25 words produced by male, female, middle and lower class subjects for the ideation level Enumeration

| Type | Sex (40) | | Social Class (40) | | Total |
|---|---|---|---|---|---|
| | Male (20) | Female (20) | Middle (20) | Lower (20) | N=40 |
| Intj. Sounds | 1.300 | 1.058 | 1.533 | .825 | 1.179 |
| Hesitations | 1.240 | .558 | 1.016 | .780 | .898 |
| Revisions | .175 | .075 | .125 | .125 | .125 |
| Un. Word Rep. | .187 | .125 | .160 | .150 | .156 |
| Unfin. Words | .190 | .125 | .066 | .250 | .158 |
| Intj. Words | .150 | .050 | .150 | .050 | .050 |
| Syll. Rep. | .087 | .075 | .112 | .050 | .081 |
| Sound Rep. | .025 | .025 | .025 | .025 | .025 |
| Phrase Rep. | .025 | .000 | .025 | .000 | .012 |
| Prolongations | .025 | .000 | .000 | .000 | .012 |
| Broken Words | .012 | .000 | .012 | .000 | .006 |
| Po. Word Rep. | .000 | .000 | .000 | .000 | .000 |
| Inc. Phrases | .000 | .000 | .000 | .000 | .000 |

TABLE 5

The mean number of disfluencies per 25 words produced by male, female, middle and lower class subjects for the ideation level Description

| Type | Sex (40) | | Social Class (40) | | Total |
|---|---|---|---|---|---|
| | Male (20) | Female (20) | Middle (20) | Lower (20) | N=40 |
| Intj. Sounds | .924 | .721 | 1.421 | .224 | .823 |
| Hesitations | .699 | .531 | .536 | .694 | .615 |
| Revisions | .340 | .186 | .267 | .257 | .262 |
| Un. Word Rep. | .080 | .212 | .128 | .370 | .249 |
| Phrase Rep. | .081 | .172 | .095 | .157 | .126 |
| Unfin. Words | .145 | .072 | .184 | .033 | .109 |
| Syll. Rep. | .035 | .155 | .154 | .036 | .095 |
| Intj. Words | .129 | .010 | .131 | .008 | .069 |
| Sound Rep. | .091 | .007 | .042 | .056 | .049 |
| Prolongations | .068 | .018 | .080 | .005 | .043 |
| Po. Word Rep. | .044 | .016 | .044 | .016 | .030 |
| Inc. Phrases | .004 | .045 | .017 | .033 | .025 |
| Broken Words | .015 | .034 | .049 | .003 | .025 |

TABLE 6

The mean number of disfluencies per 25 words produced by male, female, middle and lower class subjects for the ideation level Interpretation

| Type | Sex (40) | | Social Class (40) | | Total |
|---|---|---|---|---|---|
| | Male (20) | Female (20) | Middle (20) | Lower (20) | N=40 |
| Intj. Sounds | .683 | .797 | .811 | .639 | .725 |
| Hesitations | .614 | .546 | .514 | .647 | .580 |
| Un. Word Rep. | .301 | .335 | .255 | .382 | .318 |
| Revisions | .329 | .271 | .251 | .348 | .299 |
| Phrase Rep. | .175 | .108 | .096 | .187 | .142 |
| Syll. Rep. | .072 | .055 | .103 | .025 | .064 |
| Unfin. Words | .050 | .068 | .075 | .043 | .059 |
| Sound Rep. | .054 | .020 | .049 | .025 | .025 |
| Intj. Words | .029 | .039 | .042 | .026 | .034 |
| Broken Words | .006 | .025 | .018 | .013 | .015 |
| Po. Word Rep. | .025 | .000 | .000 | .025 | .013 |
| Prolongations | .024 | .000 | .024 | .000 | .012 |
| Inc. Phrases | .004 | .000 | .004 | .000 | .002 |

TABLE 7

The mean number of disfluencies per 25 words produced by male, female, middle and lower class subjects for the ideation level Spontaneous Speech

| Type | Sex (40) | | Social Class (40) | | Total |
|---|---|---|---|---|---|
| | Male (20) | Female (20) | Middle (20) | Lower (20) | N=40 |
| Intj. Sounds | .475 | .300 | .500 | .275 | .388 |
| Revisions | .050 | .125 | .125 | .050 | .088 |
| Hesitations | .125 | .000 | .050 | .050 | .063 |
| Un. Word Rep. | .125 | .000 | .075 | .050 | .063 |
| Phrase Rep. | .100 | .000 | .025 | .075 | .050 |
| Syll. Rep. | .075 | .000 | .025 | .050 | .038 |
| Inc. Phrases | .025 | .000 | .025 | .000 | .013 |
| Unfin. Words | .025 | .000 | .000 | .025 | .013 |
| Sound Rep. | .000 | .000 | .000 | .000 | .000 |
| Po. Word Rep. | .000 | .000 | .000 | .000 | .000 |
| Prolongations | .000 | .000 | .000 | .000 | .000 |
| Intj. Words | .000 | .000 | .000 | .000 | .000 |
| Broken Words | .000 | .000 | .000 | .000 | .000 |

TABLE 8

Cell means and standard deviations for the total number of disfluencies per 25 words according to sex, social class, and ideation level

| Groups | Enumer. | Descrip. | Interp. | Spon. Speech |
|---|---|---|---|---|
| Male Middle | | | | |
| Mean | 3.124 | 3.915 | 2.378 | 1.100 |
| Std. Dev. | 1.916 | 1.567 | 1.470 | 2.183 |
| Male Lower | | | | |
| Mean | 2.250 | 2.722 | 2.289 | .850 |
| Std. Dev. | 2.452 | 1.135 | 1.062 | 1.203 |
| Female Middle | | | | |
| Mean | 1.882 | 2.375 | 2.132 | .550 |
| Std. Dev. | 1.182 | 1.128 | 1.416 | .497 |
| Female Lower | | | | |
| Mean | 2.300 | 2.558 | 2.395 | .3000 |
| Std. Dev. | 2.299 | 1.651 | 1.609 | .674 |

To test the relationship of ideation level to the occurrence of disfluency a repeated measures analysis of variance was performed with two independent variables, sex and social class and one factor, ideation level, on the repeated measurement of disfluency. Many of the speech samples did not contain 100 words in each of the four ideation levels. Therefore the analysis with respect to ideation level was based on the number of disfluencies per 25 words.

Regardless of sex and social class, significantly more disfluencies were produced at the description level than during interpretation (Table 9). The difference between description and enumeration levels was not statistically significant (Table 10). When ideation levels were held constant, the sex and social class differences were not significant (Table 11).

In the second analysis, including all four levels of ideation, the number of disfluencies produced during spontaneous speech was compared with the amount produced at the other three levels. The children regardless of their sex and social class, produced significantly more disfluencies during description and interpretation than during spontaneous speech (Tables 12 and 13). The difference between the number of disfluencies produced during enumeration and spontaneous speech was not significant (Table 14). When ideation levels were held constant, the sex and social class differences were not significant (Table 15).

TABLE 9

Repeated measures analysis of variance testing the influence of sex and social class on the occurrence of disfluencies between ideation levels Description and Interpretation

| Source of Variation | d.f. | Mean Square | F | P < |
|---|---|---|---|---|
| Ideation Level (Description-Interpretation) | 1 | 7.0508 | 9.0582 | .0048 |
| Sex (Males-Females) | 1 | 3.0537 | 3.9231 | .0554 |
| Social Class (Middle-Lower) | 1 | 1.7553 | 2.2550 | .1420 |
| Sex by Social Class Interaction | 1 | 1.3133 | 1.6872 | .2023 |
| Within (Error Term) | 36 | .7783 | | |

**< .01

TABLE 10

Repeated measures analysis of variance testing the influence of sex and social class on the occurrence of disfluencies between ideation levels Description and Enumeration

| Source of Variation | d.f. | Mean Square | F | P< |
|---|---|---|---|---|
| Ideation Level (Description-Enumeration) | 1 | 1.1358 | .6128 | .4389 |
| Sex (Male-Female) (Middle-Lower) | 1 | .1220 | .0658 | .7991 |
| Sex by Social Class Interaction | 1 | .3046 | .1643 | .6876 |
| Within (Error Term) | 36 | 1.8535 | | |

TABLE 11

Repeated measures analysis of variance testing the influence of sex and social class on the occurence of disfluencies, holding ideation level constant

| Source of Variation | d.f. | Mean Square | F | P < |
|---|---|---|---|---|
| Grand Mean | 1 | 766.0348 | 142.6571 | .0001 |
| Sex (Male-Female) | 1 | 7.6760 | 1.4295 | .2397 |
| Social Class (Middle-Lower) | 1 | 1.3932 | .2595 | .6137 |
| Sex by Social Class Interaction | 1 | 7.6054 | 1.4163 | .2418 |
| Within (Error Term) | 36 | 5.3697 | | |

TABLE 12

Repeated Measures analysis of variance testing the influence of sex and social class on the occurence of disfluencies between ideation levels Description and Spontaneous Speech

| Source of Variation | d.f. | Mean Square | F | P < |
|---|---|---|---|---|
| Ideation Level (Description-Spon Speech) | 1 | 51.7453 | 54.5169 | .0001** |
| Sex (Males-Females) | 1 | 1.9548 | 2.0595 | .1599 |
| Social Class (Middle-Lower) | 1 | 1.9585 | 1.2627 | .2686 |
| Sex by Social Class Interaction | 1 | 2.4040 | 2.5328 | .0876 |
| Within (Error Term) | 36 | .9491 | | |

** < .01

TABLE 13

Repeated measures analysis of variance testing the influence of sex and social class on the occurence of disfluencies between ideation levels Interpretation and Spontaneous Speech

| Source of Variation | d.f. | Mean Square | F | P< |
|---|---|---|---|---|
| Ideation Level (Interpretation-Spon. Speech) | 1 | 51.1040 | 28.9203 | .0001** |
| Sex (Male-Female) | 1 | 1.1520 | .6519 | .4248 |
| Social Class (Middle-Lower) | 1 | .5678 | .3213 | .5744 |
| Sex by Social Class Interaction | 1 | .1549 | .0876 | .7689 |
| Within (Error Term) | 36 | 1.7670 | | |

** < .01

TABLE 14

Repeated measures analysis of variance testing the influence of sex and social class on the occurence of disfluencies between ideation levels Enumeration and Spontaneous Speech

| Source of Variation | d.f. | Mean Square | F | P < |
|---|---|---|---|---|
| Ideation Level (Enumeration-Son. Speech) | 1 | 5.4294 | 2.1435 | .1519 |
| Sex (Male-Female) | 1 | .0835 | .0330 | .8570 |
| Social Class (Middle-Lower) | 1 | .0002 | .0001 | .9930 |
| Sex by Social Class Interaction | 1 | .9603 | .3791 | .5420 |
| Within (Error Term) | 36 | 2.5329 | | |

TABLE 15

Repeated measures analysis of variance testing the influence of sex and social class on the occurence of disfluencies, holding ideation level constant

| Source of Variation | d.f. | Mean Square | F | P < |
|---|---|---|---|---|
| Grand Mean | 1 | 685.5426 | 152.9675 | .0001 |
| Sex (Male-Female) | 1 | 10.6864 | 2.3845 | .1313 |
| Social Class (Middle-Lower) | 1 | 2.0093 | .4483 | .5074 |
| Sex by Social Class Interaction | 1 | 5.7040 | 1.2728 | .2668 |
| Within (Error Term) | 36 | 4.4816 | | |

All 13 types of disfluency included in the present category system were produced by the children from each sex and social class group. There was considerable variation in the frequency of occurrence of the various kinds, however.

Most of the disfluencies produced, regardless of sex and social class, consisted of hesitations and interjections of sounds (Tables 16 and 17). Together they accounted for 66 percent of all disfluencies produced.

The results of the disfluency distribution confirmed the prediction that disfluencies produced by a nonstuttering preschool population would consist largely of interjections, pauses (hesitations) and revisions. There were more instances of unitary word repetition and fewer occurrences of polysyllabic word repetition and incomplete phrases than expected.

The prediction that units of repetition would rarely exceed one unit per instance of repetition was confirmed. Of the 218 occurrences of repetitions, only 12 were multiple unit repetitions (Table 18).

TABLE 16

Number and percent of total disfluencies by type of disfluency for each sex and two social classes for 40 children

| Type | Sex | | | | Social Class (40) | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male (20) | | Female (20) | | Middle (20) | | Lower (20) | | N=40 | |
| | # | % | # | % | # | % | # | % | # | % |
| Hesitations | 261 | 33.76 | 175 | 33.14 | 283 | 36.90 | 153 | 28.65 | 436 | 33.51 |
| Intj. So. | 251 | 32.47 | 173 | 32.76 | 251 | 32.73 | 173 | 32.40 | 424 | 32.59 |
| Revisions | 79 | 10.22 | 47 | 8.90 | 60 | 7.82 | 66 | 12.36 | 126 | 9.68 |
| Un. Word Rep. | 48 | 6.21 | 46 | 8.71 | 33 | 4.30 | 61 | 11.42 | 94 | 7.23 |
| Phrase Rep. | 25 | 3.23 | 23 | 4.36 | 20 | 2.61 | 28 | 5.24 | 48 | 3.69 |
| Unfin. Words | 26 | 3.36 | 16 | 3.03 | 29 | 3.78 | 13 | 2.43 | 42 | 3.23 |
| Sound Rep. | 24 | 3.11 | 17 | 3.22 | 22 | 2.87 | 19 | 3.56 | 41 | 3.15 |
| Intj. Words | 24 | 3.11 | 5 | .95 | 25 | 6.26 | 4 | .75 | 29 | 2.23 |
| Syll. Rep. | 11 | 1.42 | 13 | 2.46 | 16 | 2.09 | 8 | 1.50 | 24 | 1.84 |
| Inc. Phrases | 6 | .78 | 4 | .76 | 9 | 1.17 | 1 | .19 | 10 | .77 |
| Prolongations | 7 | .91 | 3 | .57 | 8 | 1.04 | 2 | .37 | 10 | .77 |
| Po. Word Rep. | 8 | 1.03 | 1 | .19 | 4 | .52 | 5 | .94 | 9 | .69 |
| Broken Words | 3 | .39 | 5 | .95 | 7 | .91 | 1 | .19 | 8 | .62 |
| | 773 | 100 | 528 | 100 | 767 | 100 | 534 | 100 | 1301 | 100 |

Note: Intj. = Interjections; Un. - Unitary; Unfin. = Unfinished; Syll. = Syllable; Inc. = Incomplete; So. = Sound; Rep. = Repetitions; Po. = Polysyllabic; # = number of disfluencies; % = percent of total disfluencies

TABLE 17

The mean number of disfluencies per 100 words produced

| Type | Sex (40) | | Social Class (40) | | Total (40) |
|---|---|---|---|---|---|
| | Male (20) | Female (20) | Middle (20) | Lower (20) | N=40 |
| Hesitations | 5.057 | 3.557 | 5.307 | 3.307 | 4.330 |
| Intj. Sounds | 4.942 | 3.557 | 5.100 | 3.399 | 4.250 |
| Revisions | .832 | .999 | .998 | 1.331 | 1.165 |
| Un. Word Rep. | .871 | 1.007 | .672 | 1.256 | .939 |
| Phrase Rep. | .394 | .483 | .294 | .583 | .438 |
| Sound Rep. | .398 | .349 | .373 | .374 | .373 |
| Unfin. Words | .360 | .332 | .460 | .232 | .346 |
| Intj. Words | .505 | .116 | .546 | .074 | .311 |
| Syllable Rep. | .191 | .282 | .282 | .191 | .237 |
| Prolongations | .161 | .066 | .177 | .050 | .114 |
| Po. Word Rep. | .171 | .020 | .072 | .050 | .098 |
| Inc. Phrases | .083 | .091 | .149 | .025 | .075 |
| Broken Words | .037 | .074 | .087 | .025 | .056 |

TABLE 18

The number of total repetitions, and the number and percentage of multiple unit repetitions

| Type | SEX (40) | | | | | | SOCIAL CLASS (40) | | | | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MALE | | | FEMALE | | | MIDDLE | | | LOWER | | | N= 40 | | |
| | O | MU | % | O | MU | % | O | MU | % | O | MU | % | O | MU | % |
| Sound | 24 | 4 | 16.6 | 17 | 1 | 5.8 | 22 | 3 | 13.6 | 19 | 2 | 10.5 | 41 | 5 | 12.1 |
| Syllable | 8 | 1 | 12.5 | 18 | 0 | 0.9 | 17 | 0 | 0.0 | 9 | 1 | 11.1 | 26 | 1 | 3.9 |
| Unitary Word | 48 | 2 | 4.1 | 46 | 3 | 6.5 | 33 | 1 | 3.0 | 61 | 4 | 6.5 | 94 | 5 | 5.3 |
| Poly. Word | 8 | 0 | 0.0 | 1 | 0 | 0.0 | 4 | 0 | 0.0 | 5 | 0 | 0.0 | 9 | 0 | 0.0 |
| Phrase | 25 | 0 | 0.0 | 23 | 1 | 4.3 | 20 | 0 | 0.0 | 28 | 1 | 3.4 | 48 | 1 | 2.1 |

Note: O = total number of occurences of repetition; MU = number of instances of multiple unit repetition; % = percentage of each repetition type which is multiple unit.

## DISCUSSION

As anticipated, disfluencies were a frequent occurrence in the speech of the 40 preschool children selected for this study: an average of 13.7 disfluencies per 100 words uttered.

Results from the distributional analysis revealed a pattern in the frequency of occurrence of certain types of disfluencies. Disfluencies characteristic of normal disruption in speech, such as hesitations, interjections of sounds and revisions occurred far more often than sound, syllable and unitary word repetitions, prolongations and broken words which are most often associated with stuttering behavior. There were few instances of multiple unit repetitions which have been associated with the identification of stuttering. It is the persistency of certain types of multiple unit repetition, notably syllable repetition which has been particularly associated with the identification of stutterers (Sander, 1963).

The occurrence of all disfluencies appeared to be related to two psycholinguistic phenomena, groping and self-monitoring behavior, described by Tannenbaum et al. (1965). The children were often disfluent when they attempted to search for the "right" word or phrase. If they perceived they had made an inaccurate response, they often went back and corrected it.

There was considerable variation among amounts of disfluencies produced by children within their sex and social class groups. It is possible that variables other than sex and social class were related to the within group variation.

Middle class males produced more disfluencies than any other group. Their higher disfluency rate might be in response to increased social demands, competitions and frustrations males face in relation to speech and language situations (Goldman, 1967; Schuell, 1946).

It was predicted that levels of ideation requiring more complex verbal planning and therefore more complex cognitive mediation, should result in greater amounts of disfluency. More disfluencies occurred, however, during description than during interpretation. During description, most children seemed to be concerned that their statements were accurate. They often attempted to describe everything visible in the stimulus photographs, including partially obscured objects.

Spontaneous speech was characterized by greater fluency than the other levels, along with a more rapid speaking rate and a minimum of pausing. Results showed that within a structured situation, spontaneous utterances result in fewer disfluencies than elicited ones. This finding is consistent with Silverman (1972) who found that preschool males produced more disfluencies in speech elicited in a structured situation than in an unstructured one.

## SUMMARY AND CONCLUSIONS

The data from the present study suggest that the preschool child, while passing through a period of frequent disruption in speech, rarely manifests speech characteristics associated with stuttering behavior. The disfluency types that occurred frequently in the children's speech were those kinds associated with normal speech disruption. When the children repeated sounds, syllables or phrases, they rarely repeated them more than once. The resultant speech pattern, although frequently disrupted, was rhythmic and flowing, free from tense involuntary kinds of repetitions and hesitations.

No significent difference was found between amounts of disfluency produced by males and females sampled from middle and lower class populations. The middle class preschool males, however, produced significantly more disfluencies than middle class preschool females.

No significant difference was found between the total amount of disfluencies produced by middle and lower class preschool children.

This study provided additional evidence that verbal planning is related to the occurrence of disfluencies. More disfluencies occurred during the description level than during interpretation. Significantly fewer disfluencies occurred during spontaneous speech than during elicited speech at other ideation levels.

The role of cognitive mediation (verbal planning) in speech production is evidently an important one which needs careful assessment at various levels. The relationship of type of verbal expression (reading, elicited, or spontaneous speech) to verbal planning and disfluency should be explored more extensively.

It is possible that the occurrence of disfluencies is related to variables other than sex and social class. Future research might consider variables such as: linguistic maturity, intelligence, evironmental experience, maturation and willingness to verbalize.

## Bibliography

Bernstein, B. Linguistic codes, hesitation phenomena and intelligence, Language and Speech 5 (1962), 31-46.

Berry, M.F. Language disorders in children: The basis and diagnosis. New York: Appleton-Century-Crofts, 1969.

Blankenship, J. and Kay, C. Hesitation phenomena in English speech: A study in distribution. Word 20 (1964), 360-372.

Bloodstein, O. A handbook on stuttering. Chicago: National Easter Seal-Society for Crippled Children and Adults, 1969

Branscom, M.E., Hughes, J. and Oxtoby, E.T. Studies of non-fluency in the speech of preschool children. In Stuttering in children and adults, Wendell Johnson (ed.) Minneapolis, Minnesota: University of Minnesota Press, 1955, pp. 157-180.

Burstein, B. The loci of disfluencies in the spontaneous speech of normal speaking children in the first grade. Unpublished Master's thesis, Indiana University, 1965.

Fries, C. What is a sentence? In Perspectives on Language, Rycenga, J. and Joseph Schwartz (eds.) New York: The Ronald Press Company, 1963, 196-208.

Goldman, R. Cultural influencies on the sex ratio in the incidence of stuttering. American Anthropologist 69(1967), 78-81.

Goldman-Eisler, F. Psycholinguistics: Experiments in Spontaneous Speech. London: Academic Press, 1968.

Goldman-Eisler, F. The significance of changes in the rate of articulation. Language and Speech 4 (1961b), 171.

Helsabeck, M.V. Types and loci of disfluencies in the spontaneous speech of normal speaking fourth grade children. Unpublished Master's thesis, Indiana University, 1965.

Johnson, W. Measurements of oral reading and speaking rate and disfluency of adult male and female stutterers and nonstutterers. JSHD (monog. Suppl. No. 7), 1-20, 1961

Kools, J.A. and Berryman, J.D. Differences in disfluency behavior between male and female nonstuttering children. JSHR 14(1971), 125-130.

Lanyon, R.I. Some characteristics of nonfluency in normal speakers and stutterers. JASP 13 (1968), 550-555

Let's start picture box: School experiences. Englewood Cliffs, N.J.: Scholastic Magazines, 1968.

Levin, H. and Silverman, I. Hesitation phenomena in children's speech. Language and Speech 8 (1965), 67-85.

Maclay, H. and Osgood, C. Hesitation phenomena in spontaneous English speech. Word 15 (1959), 19-44.

Menyuk, P. Comparison of grammar of children with functionally deviant and normal speech. JSHR 7 (1964), 109-121.

Ortsey, E. Types of disfluencies in the spontaneous speech of normal speaking children in the first and second grades. Unpublished Master's thesis, Indiana University, 1964.

Sander, E. K. Frequency of syllable repetition and 'stutterer' judgments, JSHD 28(1963), 19-30.

Schuell, H. Sex differences in relation to stuttering: part 1 JSD 11(1946), 277-298.

Schlesinger, I., Melkman, R. and Levy, R. Word length and frequency as determinants of stuttering. Psychonomic Science 6(1966), 255-256.

Silverman, E. Generality of disfluency data collected from preschoolers. JSHR 15 (1972), 84-92.

Tannenbaum, P.H., Williams, S.F. and Hillier, C.S. Word predictability in the environments of hesitations. JVLVB 4(1965), 134-140.

Williams, F. and Naremore, R.C. On the functional analysis of social class differences in modes of speech. 36(1969), 77-102.

Wingate, M.E. A standard definition of stuttering. JSHD 29(1964), 484-489.

Winitz, H. Language skills of male and female kindergarten children. JSHR 2(1959), 377-386